

## EO Scanned Micro-LADAR, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



## ABSTRACT

In this phase II SBIR we will design, build, test, and deliver new scanning based micro-ladar sensors with unprecedented small size, weight, and power (SWaP), thereby enabling scanning LADAR deployment on previously inaccessible platforms such as satellites. The system will range out to > 1 km, have high frame rates, high resolution (up to 500 × 500), high range accuracy (<5 cm), weigh less than a kg, be constructed from space deployable technologies with no-moving parts. The enabling technology for this Micro-LADAR system is a combination of two new electro-optic laser scanning technologies: high speed refractive continuous scanners with a 60° × 15° field of view (FOV) and diffractive-waveplate discrete or step-wise scanners to boost the total FOV (ultimately up to unthinkable angles such as 120° × 120°). The results will be a very low-power, long-life (no moving parts), radiation hard, micro-LADAR.

## ANTICIPATED BENEFITS

### To NASA funded missions:

Potential NASA Commercial Applications: A specific NASA application for Micro-LADAR is for deployment on geosynchronous satellite servicing and refueling missions, such as "Restore". Micro-LADAR will aid with location, alignment, and docking between the servicing satellite and the GEO-satellite to be serviced. Other potential NASA applications include asteroid and space junk rendezvous; both areas of growing significance. Furthermore, situational awareness, terrain mapping, and collision avoidance will be enabled by micro-LADAR deployed on small UAV platforms.

### To the commercial space industry:

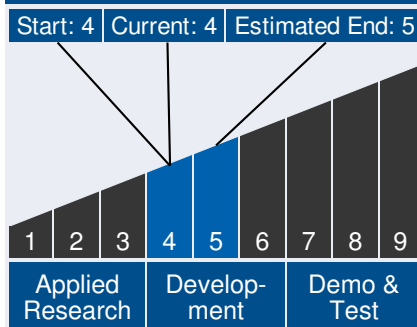
Potential Non-NASA Commercial Applications: Commercial applications for Micro-LADAR are numerous. In Oil & Gas LADAR is used for dynamic positioning of tankers during docking operations with platforms and for security on oil



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## Technology Maturity



## Management Team

### Program Executives:

- Joseph Grant
- Laguduva Kubendran

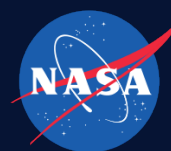
### Program Manager:

- Carlos Torrez

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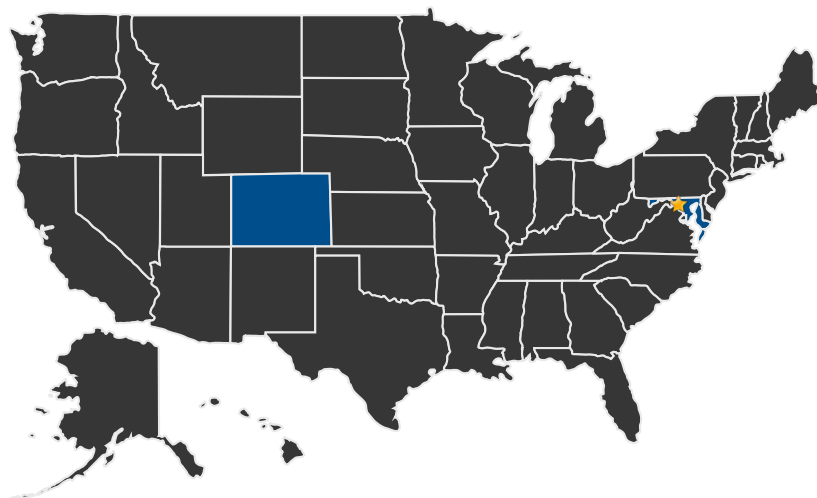
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platforms due to its ability to track vessels and better sensitivity to non-metallic vessels. LIDAR is also being used to measure the length of the drill string. Transportation is a large potential market for Micro-LADAR. It may be used to trigger fixed cameras and measure vehicle speeds. A new application is to mount imaging LADAR under gantries for vehicle profiling and tracking for law enforcement. LADAR is also being used for vehicle separation monitoring, over height warnings, and axle counting. For security markets LADAR can be used to trigger or mark video cameras and as motion sensors they have a much greater range than the current technology. For perimeter security, LADAR is being used to detect, track, image and ID intruders.

## U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States  
With Work

★ **Lead Center:**  
Goddard Space Flight Center

### Other Organizations Performing Work:

- Vescent Photonics, Inc. (Golden, CO)

### Management Team (cont.)

**Project Manager:**

- Anthony Yu

**Principal Investigator:**

- Scott Davis

### Technology Areas

**Primary Technology Area:**

Science Instruments,  
Observatories, and Sensor  
Systems (TA 8)

└ Remote Sensing Instruments  
and Sensors (TA 8.1)

└ Lasers (TA 8.1.5)

└ 3D Imaging Flash Light  
Detection and Ranging  
(LIDAR) (TA 8.1.5.4)



## PROJECT LIBRARY

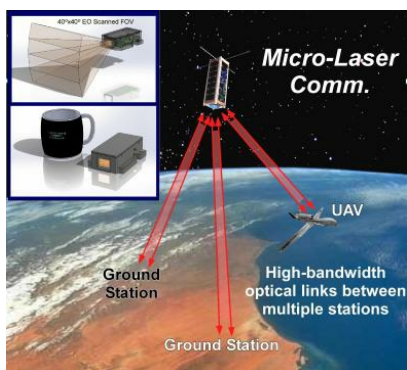
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### Presentations

- Briefing Chart
  - (<http://techport.nasa.gov:80/file/23101>)

## IMAGE GALLERY

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*EO Scanned Micro-LADAR, Phase II*

## DETAILS FOR TECHNOLOGY 1

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### Technology Title

EO Scanned Micro-LADAR

### Potential Applications

A specific NASA application for Micro-LADAR is for deployment on geosynchronous satellite servicing and refueling missions, such as "Restore". Micro-LADAR will aid with location, alignment, and docking between the servicing satellite and the GEO-satellite to be serviced. Other potential NASA applications include asteroid and space junk rendezvous; both areas of growing significance. Furthermore, situational awareness, terrain mapping, and collision avoidance will be enabled by micro-LADAR deployed on small UAV platforms.